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ABSTRACT

Forty-three hyperactive children (5 to 9 years old) and their families were assessed and followed during a 3 month intervention program. Families were randomly assigned to one of three groups: parent training in behavior modification while the child was administered a placebo, parent training plus methylphenidate, and methylphenidate only. All groups showed improved home and school behavior. However, only with medication were there also gains on measures of attention and impulse control. The results also revealed greater improvement in the area of academic achievement and classroom behavior in the medication groups as compared with children on placebo. There was no evidence of significant benefit from the addition of parent training to the administration of medication. (Author)

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Differential Effects of Parent Training and Stimulant Medication with Hyperactives: A Progress Report

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Abstract

Forty-three hyperactive children and their families were assessed and followed during a three month intervention program. Families were randomly assigned to one of three groups: parent training in behaviour modification while the child was administered a placebo, parent training plus methylphenidate and methylphenidate only. All groups showed improved home and school behaviour. However, only with medication were there also gains on measures of attention and impulse control. The results also revealed greater improvement in the area of academic achievement and classroom behaviour in the medication groups as compared with children on placebo. There was no evidence of significant benefit from the addition of parent training to the administration of medication.

Hyperactivity is one of the most common behaviour problems of childhood affecting an estimated 5 - 10% of school age children (Wender, 1975). Although high activity levels and restlessness are generally the most obvious aspects of the disorder, recent research has suggested that attentional deficits, impulse control and frustration tolerance problems are more central to the syndrome. Consequently, the parents and teachers of these children often describe them as non-compliant, prone to temper tantrums and aggressive. These traits, in turn, often lead to poor social relationships and academic difficulties (Douglas, 1972).

The treatment of choice for hyperactivity has been stimulant medication and, in fact, it appears to be the most throughly documented treatment in child psychiatry (Gittelman-Klein, Klein, Abikoff, Katz, Gloisten & Kates, 1976). Well controlled double-blind studies have demonstrated improvements with the use of stimulant medication on laboratory measures of attention and impulse control, as well as improved behaviour at home and school as rated by parents, teachers and trained observors (Barkley, 1977; Firestone, Davey, Goodman & Peters, 1978; Whalen & Henker, 1976). However, follow-up investigations with children

treated almost exclusively with stimulants have not supported these benefits on a long-term basis. Additionally, there is little evidence that this type of treatment affects academic achievement (Barkley & Cunningham, 1978).

Behaviour therapy has been advocated as an alternative to stimulants in the treatment of hyperactive children and several studies have directly compared behavioural and pharmacological interventions. Three paradigms are prominent in this body of literature; systematic case studies (O'Leary & Pelham, 1978; Pelham, 1977; Stableford, Butz, Hasazi, Leitenberg & Peyser, 1976), single subject experiments (Ayllon, Layman & Kandel, 1975; Shafto & Sulzbacker, 1977; Wulbert & Dries, 1977) and group outcome studies (Christensen & Sprague, 1973; Gittelman-Klein et al., 1976; Loney, Weissenburger, Woolson & Lighty, 1977; Wolraich, Drummond, Salomon, O'Brien & Savage, 1978). A review of this literature (Backman & Firestone, 1979) highlights its major problems.

The single subject design studies unanimously support the equivalence or superiority of behavioural interventions as compared to stimulant medication on both the behaviour and academic achievement of hyperactives. However, although often models of experimental design, they might best be conceptualized as "laboratory analogues" since

they are generally far removed from the reality of clinical implementation. For example, procedures in these reports require teacher-student ratios of one-to-one to one-to-three. In typically larger classrooms, teachers might not be interested in or able to carry out the rather elaborate programs. The most crucial deficiency, however, is the inappropriate administration of medication. Researchers, it seems, either arbitrarily chose a certain dosage of medication or did not report why particular dosages were selected. Neither was there an attempt to ascertain whether a particular child might be an adverse responder to the medication. The fact that in some studies hyperactive children were solicited through newspaper ads might increase this possibility. In clinical practice, correct dosages are established by titrating the daily frequency and dosage based on teachers and parents reports. A major deficit in the studies is the lack of generalization and follow-up data. This is particularly important for the study of behavioural interventions since there are documented cases of failure to generalize (Mash & Dalby, 1979) and there is no store of information to fall back on as there is with stimulant drug research (Weiss, Kruger, Danielson, Elman, 1975; Whalen & Henker, 1976).

The most meaningful data comparing the effectiveness of behaviour therapy and stimulant medication, with hyperactive children, derives from the group outcome literature. These studies have allowed the assessment of treatment procedures with large numbers of children utilizing feasable behavioural interventions. Generally, these results indicate that stimulant medication is the most effective form of treatment where the goal is improved classroom and interpersonal behaviour. The results concerning educational progress have been investigated only once (Wolraich et al., 1978) and do not support medications and usefulness. However, the briefness of the intervention (twenty-four ½ days) and the use of a standard dosage of medication for all children argues against accepting this as a meaningful test of medication or behavioural intervention.

In summary, although the literature contains some exemplary studies, three major problems still exist. First, rarely are well established and realistic clinical procedures utilized (studies by Gittelman-Klein et al., 1976, and Loney et al., 1976, are exceptions) and rarely is the issue of "cost-benefit" addressed. Finally, there is a paucity of data concerning the long-term effects of treatment on the behaviour and academic progress of the

children studied.

The present research also attempts to compare the relative merits of behavioural and pharmacological intervention with hyperactives and is a progress report at the end of the second year of a five year project. It is intended that by the end of the investigation, eighty hyperactives and their families will have completed treatment procedures and will have been followed for up to three years. Included in the data collection are parental characteristics (MMPI, IQ, marital satisfaction, etc.), demographic data (education, income, size of family, etc.), medical data on the hyperactive children (pregnancy and birth complications, minor physical anomalies, height, etc.), educational progress (standardized academic achievement tests), and behavioural data (rating scales filled out by parents and teachers). This report will deal only with the academic achievement and behavioural data, since larger numbers of children will be required for the multivariate approach required of the final analyses.

METHOD

Subjects

Children between 5 and 9 years of age, referred to the Learning, Psychiatry or Psychology Out-Patient services of

the Children's Hospital of Eastern Ontario were participants in the investigation. The children had as their prime difficulties, over-activity, short attention spans, impulsivity, inability to delay gratification, aggressiveness, tantrums, or oppositional behaviour and had to show these problems both at home and school. The Hyperactivity Index of Conners (1969) behaviour rating scale for teachers was required to be 15 or higher (Goyette, Conners & Ulrich, 1978) and Peabody Picture Vocabulary IQ's had to be 85 or higher. Furthermore, based upon clinical interviews, the hyperactivity (short attention span, impulsivity, inability to tolerate frustration) had to be present from earlier than 2½ years of age. All children were living at home with at least one parent. Excluded from the sample were children who showed definite signs of brain damage, epilepsy or psychosis. Families in which either parent was psychotic or in which marital discord was obviously so great that intervention would be impossible were also excluded.

PROCEDURE

All children in the study had been referred to the Department of Psychology by physicians, generally for the investigation of hyperactivity. Parents and children

were then interviewed by a psychologist. Each parent was asked to fill out Conners rating scale for parents (PRS; Conners, 1970) and a marital satisfaction questionnaire (Locke & Wallace, 1959). The identified patients' teacher was contacted and filled out Conners (1969) rating scale for teachers (TRS).

If the family met the criteria for inclusion, a full description of the project was presented in addition to information on methylphenidate. Upon agreeing to participate, further appointments were scheduled for data collection, and signed informed consent was solicited. Children were then randomly assigned to one of four groups. In one group, the parents received counselling on behaviour modification and the children received placebo (PT+P), while in another group of children, the parents received similar counselling and the children received methylphenidate (PT+M). In yet another group, parent training was provided and children received methylphenidate but the methylphenidate was replaced with placebo (PT+W) at about the fourth month, immediately after the post-treatment measures were obtained. The final group was not told about the parent training and received only methylphenidate (M). Since the report covers only the pre-and post-treatment analyses, the PT+M and PT+W groups were combined and

are referred to as the PT+M group. Parents, teachers, therapists and those testing the children were unaware of the medication conditions.

Behavioural counselling for 80% of the patients was provided by a PH.D. level psychologist (MJK) and various trainee co-therapists. The remainder of patients were provided with behavioural counselling by a graduate co-therapist of this program (M.A. level) with yet another trainee co-therapist. Once in the project, a hospital pediatrician (J.D.) or the child's physician supervised the medication. A psychologist (P.F.) was responsible for providing the patients with medication and placebo as well as supervising all psychological intervention.

It should be noted that the nature of the medical care system in Ontario ensures that virtually all health services are free and that people are at liberty to choose from among various agencies without recourse. Thus, no fees or monetary deposits were utilized in this investigation.

Parent Training:

After the screening and testing, the first requirement was that parents understand the basic social learning framework upon which the intervention procedures were

based. This was ensured by requiring parents to read a book on child management (Patterson, 1971). Contingent upon their demonstrating to the therapists an adequate understanding of the principles, the staff responded by providing a second stage in training. At this point, parents were taught to pinpoint behaviour and collect data on the target behaviour that required change. Once sufficient data were collected, they were invited to join a parents group and medication was introduced. This component of treatment consisted of an average of three sessions over five weeks, subsequent to the screening session. In the group sessions, which were generally comprised of four sets of parents, participants had a chance to learn specific behaviour management techniques and behaviour change programs through discussion. Parents were also required to present information on their progress. The groups met for six sessions over approximately ten weeks. During group session three or four, parents were instructed on how to best deal with school personnel, home-school contracting was also described and parents were encouraged to set up contracts with teachers. Two consultation sessions were also provided to the teachers by the therapists. One session occurred at the initiation of treatment and the other after home contracting was established.

Medication:

Medication was provided the parents and they were instructed to give their child 5 mg. methylphenidate in the morning and no medication at noon for three days. This dosage was raised to 5 mg b.i.d. and then slowly increased by 5 mg. increments. Parents were contacted twice per week for the first three weeks and information was also solicited from the school concerning the child's behaviour while on medication. The same procedures were utilized in the placebo condition. Dosages were determined either by a reported decrease in problematic behaviour or indications of negative side effects (drowsiness, headaches, stomach aches, irritability). The average dosage of methylphenidate was 22 mg. per day with a minimum of 10 mg. and a maximum of 30 mg. Two children were switched to dextroamphetamine because of poor reactions to methylphenidate and responded well to new medication. Four other children did not respond desirably to either stimulant and were thus dropped from the study. In the placebo condition, after a titration procedure, each child took one pill in the morning and at noon, on school days.

Post-treatment tests were undertaken approximately four months after the pre-testing. Further testing will take place at approximately six month intervals for another three years.

RATING SCALES

Conners Rating Scale

Conners (1969) has developed a widely used rating scale for teachers (TRS). This scale of 39 items has been factor-analyzed to give 5 factors: 1) Conduct-Problem, 2) Inattentive-Passive, 3) Tension-Anxiety, 4) Hyperactivity, and 5) Sociability. The score for each factor is based upon the mean of the items within the factor (a four point scale, 0 - 3 is used.). The TRS has been used extensively to assess the effectiveness of psychotropic medication with hyperactive children, and has been repeatedly shown to be sensitive to drug effects (Sprague & Sleator, 1973; Sprague, Christensen & Werry, 1974; Sroufe, 1975). In addition, a recent paper (Sprague & Christensen & Werry, 1974) presents normative data for the scale.

Goyette et al. (1978) present new normative data on the Conners Scale plus reliability data concerning these factors, including the 10 point Hyperactivity Index. Research has shown that the Hyperactivity Index correlates at the .94 level with the Hyperactivity factor as such it was used rather than the Hyperactivity factor of the TRS.

Conners (1970) also developed a rating scale for

parents that discriminated between hyperactive, neurotic and normal control children. This 93 item scale has been factor-analyzed to produce eight factors: 1) Conduct-Problem, 2) Anxiety, 3) Impulsive-Hyperactive, 4) Learning Problem, 5) Psychosomatic, 6) Perfectionism, 7) Anti-Social, 8) Muscular-Tension. Although this scale has not been used as extensively as the TRS, nor has it shown its sensitivity to drug effects, it is useful as a diagnostic aid.

Goyette et al., (1978) added the Hyperactivity Index through factor analysis and demonstrated that the correlation between parents and teachers on this scale is highly significant. In the present study, each parent was required to fill out this scale independently. Only the Hyperactivity Index was analyzed as an indicator of the child's home behaviour.

Assessment of emotional adjustment

Weiss et al., (1975) utilized this scale in a long term follow-up of children on methylphenidate, chlorpromazine and a control group. This is a 3 point scale based upon interview data: 1) normal, 2) slightly disturbed, 3) severly disturbed . The score is based on the total of seven factors - peer relations, mood, sexual adjustment, relationship with adults, adjustment to authority, number of nervous symptoms, ratio of delinquency. These data

were collected at the designated assessment times by an interviewer who is not involved with treatment and thus, acted as an independent assessor. The interviewer was unaware of the treatment group of the child and interviewed the parents alone.

SCHOOL PERFORMANCE

Two aspects of school performance were measured throughout the duration of this study to determine the effects of the various types of intervention with regards to academic success - reading achievement and arithmetic.

Gates-MacGinitie Reading Tests

The Gates-MacGinitie Reading Tests were used to measure the child's reading achievement. Basically, the Gates-MacGinitie is a series of tests designed to measure the child's vocabulary and reading comprehension at each level from kindergarten through Grade IX. Each level of the Gates-MacGinitie has a Vocabulary Test and a Comprehension Test. From Grade I to Grade III, there are two alternate form reliability coefficient for these levels was found to be r: .86, .87, and .85 on the Vocabulary, and .83, .81, and .87 on the Comprehension.

Metropolitan Achievement Tests

Achievement in arithmetic computation was measured by using the Arithmetic Subject Test of the Metropolitan

Achievement Tests. This is a widely recognized and well standardized test battery used to appraise students' progress from Grades I - IX.

Reaction Time Apparatus

The reaction time apparatus has been used previously (Firestone, Davey, Goodman & Peters, 1978) and has been shown to discriminate between normal and hyperactive Ss in addition to being sensitive to the effects of methylphenidate (Cohen et al., 1971; for a full description see Firestone & Douglas, 1975). Two measures are available on this task; 1) mean reaction time; 2) the total number of inappropriate responses to warning signals or responses while the subject was not to respond with the apparatus. These responses are designated "impulsive responses."

RESULTS

During the two years, 91 families met the inclusion criteria and were offered treatment. Of these, forty-three followed the treatment prescriptions and completed the post-tests. The other children and their families were distributed in the following fashion:

- twelve families refused treatment
- six families dropped out of the program right after the pre-tests

- fourteen families either stopped attending the parent training sessions or were unable to assimilate the required techniques
- six families were unable to administer medication or placebo adequately
- two children originally diagnosed hyperactive were, upon reconsideration after two individual sessions with the parents, diagnosed primarily as adjustment reaction of childhood
- one child demonstrated a psychotic process, on psychological tests, during treatment and was thus eliminated from the study
- one family moved out of town
- in two families, the marital discord became so great as to preclude parent training
- four children did not respond well to either stimulant medication and were thus dropped from the study

There were 18 children in the PT+M group, 13 in the PT+P group while the M group contained 12 children.

The mean age of the children in the study was 7.32± 1.09 years and the mean Peabody Picture Vocabulary IQ 116± 14. Analyses of variance indicated there were no significant differences between the three treatment groups on

these variables.

Data were further analyzed to determine the effect of each treatment (within treatment) and also to assess whether treatments differed from each other (between treatment). As mentioned earlier, there were 4 groups, PT+P, PT+M, PT+W, and M. However, since this is only a pre-post analysis, the PT+M and PT+W groups were collapsed to form a PT+M condition. The between treatments differences were analyzed by an analysis of covariance in which the post-treatment scores were adjusted for any initial differences between the groups. The within treatment effects were established by using t-tests for correlated means. Because no prediction could be made two-tailed tests were used (Gittelman, Klein, Klein, Abikoff, Pelixbord, Katz, Gloisten, Kates & Soraf, 1975).

Academic and Attentional Measure

The within treatment analyses revealed that all treatment groups showed several significant gains. As Table 1 indicates, the three groups showed improved academic achievement on Metropolitan Grade Equivalent scores. However, only in the medication groups were there similar gains on the Gates-MacGinitie Verbal scores and some improvement on the Comprehension scores. Significant improvement was evident on reaction time and impulse control in the medication but

not placebo children.

Behavioural Ratings

A significant correlation was found between the mothers and fathers ratings on the Hyperactive Index ($r=.59$, $p<.001$). Hence, only mothers ratings will be reported, although it is of interest to note that fathers, generally, rated their children less hyperactive than mothers ($\bar{X}$'s of 18.62 and 20.81 respectively; $t(4.22)=4L$, $p<.001$.

All groups improved uniformly on the Conduct-Disorder, Inattentive-Passive and Hyperactivity Index factors as well as emotional adjustment. However, the Anxiety factor was not affected by the intervention.

The analyses of covariance were quite revealing. Significant differences between groups on post-test scores were found on the Gates-MacGinitie Verbal grade equivalent $F(2, 26)=3.34$, $p<.05$, mean reaction times $F(2, 39)=8.14$, $p<.001$ and the teachers Hyperactivity Index $F(2,39)=8.49$, $p<.001$. Since there were significant differences between the covariants on these measures, t-tests for adjusted cell means were carried out in order to compare effects across treatments (Winer, 1971, pg. 772). On the Gates-MacGinitie and reaction time tests, both medication groups showed significant improvement over the placebo group ($p<.01$), but did not differ from each other. The analysis

of the Hyperactivity Index resulted in a significant difference between M and PT+M ($p < .01$) as well as PT+P ($p < .001$). In addition, there was a trend favouring the superiority of PT+M over PT+P ($p < .08$).

DISCUSSION

The results of the present study are consistent with previous research investigating the effects of medication and behaviour therapy with hyperactive children and are rather encouraging. It seems that parent training, as used in this investigation, can be implemented to affect some positive change with most hyperactives in a regular out-patient clinic. Medication has also demonstrated its effectiveness in dealing with many problems related to hyperactivity. Improved home and classroom behaviour, emotional adjustment and academic achievement was evident in all treatment groups. However, with medication, the gains were greater and there were also desirable changes in attention and impulse control. Whether the academic gains in the medication groups were due to increased "performance" or actual "achievement" remains to be demonstrated. Only further testing with these children while they are off medication can answer this question. The improved attention and impulse control, it is safe to say, will probably disappear once children are no longer on

medication (Firestone, Davey, Goodman, Peters, 1978). It is clear however, that children in the medication groups demonstrated greater improvement in classroom behaviour than those on placebo. In fact, there is no evidence in the data of a significant benefit from the addition of parent training.

The lack of a no treatment control and the improvement with all forms of treatment necessitates reservation in interpreting the present finding in general, and for the behaviour therapy groups in particular. It could be argued that the improvements with behaviour therapy are really a placebo effect, since the gains were most apparent on those measures affected by parents and teachers (e.g., rating scales and emotional adjustment), and that stimulant medication resulted in significantly greater gains than parent training on a number of measures. However, several previous findings utilizing similar measures with placebo conditions (Firestone et al., 1978; Gittelman-Klein, Klein, Katz, Saraf & Pollock, 1976) and waiting list controls (Firestone, Kelly & Fike, 1979; O'Leary, 1976) have not found similar improvement. It appears, therefore, that the demonstrated change is not due to a time or placebo effect. Another criticism that might be levied against the conclusion of improved behaviour with all interventions

concerns the notoriety of behaviour rating scales as reliable indicators of change, without concurrent validation by observational data. Two recent studies are of importance in this regard. Jacob, O'Leary and Rosenblatt (1978) showed that the Hyperactivity Index is significantly correlated with ratings of hyperactivity by trained observers, in a classroom situation. However, Gittelman-Klein et al., (1976) found that the TRS findings were the same as observations by trained observers only in medication groups. Children whose teachers were receiveing behavioural consultation were rated as improved on the TRS but not by the observers.

A particularly interesting development has occured with the PT+W children who at approximately the fourth month had their medication slowly replaced by placebo. The parents and teachers of seven out of eight of these children contacted the project within five weeks of the substitution to complain about the re-emergence of difficult and disruptive behaviour. Reference was often made to inattentiveness, tantrums, as well as oppositional and aggressive behaviour. Ethical considerations dictated these children be placed on medication again and there was a subsequent improvement in behaviour, as reported verbally

by parents and teacher. A similar phenomenon was not apparent in the placebo children who went through a similar procedure of having their original pills replaced (placebo to placebo). In this instance, only one child was placed on medication within two weeks of the post-tests. Two other children were placed on medication three months after the post-tests after parents and teachers expressed concern over the children's lack of academic and interpersonal progress. Subsequent verbal reports indicated the children were progressing better with medication. It seems almost as if there was a "contrast effect" in the PT+W group - that is it may be that adults grew accustomed to better behaviour from the children while on medication than they were able to show in the placebo condition, although the behaviour of both groups improved over baseline.

In assessing the efficacy of the treatment procedures several factors that are not readily analyzed in a statistical fashion merit consideration. The 52% rejection and attrition rate reveals that parents are often not as concerned with their children's problematic behaviour as professionals might wish. Several categories of "drop outs" were noted. Several parents simply wanted a full psychological assessment of their children and agreed to participate in the

project to expedite this desire. Another sizeable group of parents dropped out of the project due to the amount of work required with respect to behavioural intervention (e.g., charting, attending meetings). This appeared to be particularly problmatic with single parents and younger parents (Firestone, Witt & Sonek, 1979). A smaller number of parents were simply unable or unwilling to carry through with the regularity required in administering medication to their children. Although no children were eliminated from the study due to lack of school cooperation a small number of teachers were reluctant to carry out the required procedures because of personal convictions or lack of time and resources.

Another important factor that concerns treatment efficacy is cost. Parent training has demonstrated that it is an affordable intervention when the goal is improved home and school behaviour. After the diagnostic session, each family spent approximately 12 hours in therapy - three individual sessions and six with other parents. In addition, approximately three hours per child were devoted to teacher consultation by a therapist. Only 8 hours of consultation were required aside from the normal procedures to deal with family or marital issues. Nevertheless, the approximately two hours per patient (aside

from diagnosis) required to distribute the medication, inform the parents about its effects and side effects as well as monitoring the titration procedures by telephone was considerably less than the time committment to parent training.

It appear quite clear that both behavioural and pharmacological interventions are of some benefit to hyperactive children. Quite possibly the most effective intervention would include some combination of therapeutic techniques, such as medication, parent training and educational services. Presently, the personal and demographic characteristics of hyperactive children and their families that might predict response to anyone or combination of intervention offered in this study is under investigation but is not yet available (Firestone et al., 1979). Until that time, however, there is no evidence in the present data to support the strategy of using stimulant medication only as a last resort as has been suggested by some (Grinspoon & Singer, 1973). Rather, given the fact that there are often considerable personnel constraints in clinical settings resulting in some children, including non-hyperactives, being placed on long waiting lists or being denied services altogether, it is suggested that the judicious application of stimulant medication be the

first intervention with hyperactives. Other forms of treatment such as behavioural intervention could be provided when available or necessary.

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Table 1. Mean Academic, Attention and Impulse Control Scores

Groups	Metropolitan		Gates-MacGinitie Verbal Grade		Gates-MacGinitie Comprehension Grade		Reaction Time		Impulsive Responses	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
P.T.+M (N)	2.13±1.14 (13)	2.49±1.16*	2.54±1.28 (18)	3.10±1.45*	2.37±.94 (15)	2.70±1.04	.90±.24 (18)	.70±.25*	20.41±16.16 (18)	9.76±11.64*
P.T.+P (N)	1.88±1.16 (13)	2.30±1.43*	2.62±2.11 (13)	3.14±2.52	3.79±1.74 (7)	4.21±1.92	.86±.25 (13)	.84±.32	16.33±15.71 (13)	13.42±16.75
M (N)	1.77±.03 (12)	2.58±1.54*	2.33±1.71 (12)	3.22±2.03*	2.59±1.09 (8)	4.14±1.79*	.93±.35 (12)	.70±.26*	17.89±14.58 (12)	10.0±12.47*

*p <.01 based upon two-tailed t-tests for correlated means.

Table 2. Mean Emotional Adjustment and Conners' Scores by Teachers and Parents

Groups	Conduct Disorder		Inattentive Passive		Anxiety		Teachers' Hyperactivity Index		Mothers' Hyperactivity Index		Emotional Adjustment	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
P.T.+M (N)	.72±.52 (18)	.25±.25*	1.47±.62 (18)	.91±.74*	.53±.39 (18)	.49±.49	18.11±3.20 (18)	8.9±4.93*	20.00±4.94 (18)	13.50±7.26*	12.81±3.49 (16)	9.56±2.80*
P.T.+P (N)	.95±.57 (13)	.51±.52*	1.22±.43 (13)	.67±.47*	.38±.34 (13)	.37±.35	18.23±3.34 (13)	11.77±4.83*	21.47±4.50 (13)	14.9±6.58*	13.17±3.54 (12)	11.17±3.64*
M (N)	.78±.62 (12)	.22±1.9*	1.46±.45 (12)	.72±.55*	.56±.34 (12)	.48±.51	18.33±4.43 (12)	4.68±3.34*	21.33±5.85 (12)	13.58±4.99*	13.75±2.43 (8)	9.5±2.13*

*p <.01 based upon two-tailed t-tests for correlated means.